

### **REMARKS**

The paper is in response to the Office Action mailed December 22, 2010 ("the Office Action"). The foregoing amendment amends claims 21-25 and adds new claims 26-30. Claims 21-30 are now pending in view of the amendments. Applicants respectfully request reconsideration of the application in view of the above amendments to the claims and the following remarks. For Examiner's convenience and reference, Applicants present remarks in the order that the Office Action raises the corresponding issues.

In connection with the prosecution of this case and any related cases, Applicants have, and/or may, discuss various aspects of the disclosure of the cited references as those references are then understood by the Applicants. Because such discussion could reflect an incomplete or incorrect understanding of one or more of the references, the position of the Applicants with respect to a reference is not necessarily fixed or irrevocable. Applicants thus hereby reserve the right, both during and after prosecution of this case, to modify the views expressed with regard to any reference.

Please note that Applicants do not intend the following remarks to be an exhaustive enumeration of the distinctions between any cited references and the claims. Rather, Applicants present the distinctions below solely by way of example to illustrate some of the differences between the claims and the cited references. Finally, Applicants request that Examiner carefully review any references discussed below to ensure that Applicants' understanding and discussion of any reference is consistent with Examiner's understanding.

Unless otherwise explicitly stated, the term "Applicants" is used herein generically and may refer to a single inventor, a set of inventors, an appropriate assignee, or any other entity or person with authority to prosecute this application.

#### **Amendments to Claims 21-25**

Applicants amend claims 21-25 to improve the readability of the claims. Claim 1 has been amended to recite process steps on separate lines. Claims 22 and 25 have been amended to use the article "the" instead of "a". Claim 23 has been amended to delete redundant elements.

### **Rejection under 35 U.S.C §103(a)**

Office Action rejects claims 21-24 under 35 U.S.C §103(a) over *Kleeman* (Investigation of...analysis) in view of *Reddy* (Surface...Techniques). Applicants respectfully traverse this rejection on the grounds that the Office Action fails to make a *prima facie* case of obviousness and fails to establish a proper motivation to modify *Kleeman* in view of *Reddy*.

Under 35 U.S.C §103(a), "[a] patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." According to MPEP §2142, "[t]he examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness." Finally, MPEP 2141.III notes that:

*"The key to supporting any rejection under 35 U.S.C. 103 is the **clear articulation of the reason(s) why the claimed invention would have been obvious**. The Supreme Court in KSR noted that the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit. The Court quoting *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006), stated that "[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." KSR, 550 U.S. at \_\_\_, 82 USPQ2d at 1396." (emphasis added)*

Claim 21 recites a process for the preparation of a catalyst composition. The process includes:

providing a solid support comprising TiO<sub>2</sub> in an amount of at least 70 wt.%, WO<sub>3</sub> in an amount of 5-20 wt.%, and optionally SiO<sub>2</sub> in an amount of up to 15 wt.%;

contacting the solid support with a vanadate (REVO<sub>4</sub>) of at least one rare earth metal (RE) selected from the group consisting of Y, Ce, Pr, Nd, Sm, Gd, Tb, Dy, Er and Yb to form a slurry; and

drying and calcining the slurry to yield the catalyst composition.

(i) Failure to Make a Prima Facie Case

Notably, claim 21 recites forming a "slurry" including "the solid support" and "rare earth vanadate". The Office Action fails to make a prima facie case because neither Kleemann nor Reddy describe the formation of a slurry that includes a solid support and a rare earth vanadate. Moreover, the Office Action fails to provide any explanation as to how or why one of skill in the art would modify Kleemann using Reddy to form a slurry including a solid support and a rare earth vanadate.

In accordance with Applicant's understanding, Kleemann is a scientific paper for "Investigation of the ammonia adsorption on monolithic SCR catalysts by the transient response analysis." According to the Kleemann paper, a comparison of the capability of adsorbing ammonia onto a catalyst comprising  $V_2O_5-WO_3/TiO_2$  with that of a catalyst comprising  $V_2O_5/TiO_2$  was conducted. As indicated in the Office Action, Kleemann is completely silent on rare earth metals and, especially, completely silent on earth metal vanadates. Kleemann does use an ammonium metavanadate, but it is well known that ammonium metavanadates are not rare earth vanadates as they are different chemical entities.

The Office Action acknowledges that Kleemann fails to teach forming a slurry with a rare earth vanadate. (Office Action p. 3). The office Action cites Reddy for its alleged teaching of  $CeO_2/SiO_2$  and  $V_2O_5/CeO_2/SiO_2$ . The Office Action also alleges that "in the process powdered support materials are added as well so they are in contact with the formed  $CeVO_4$ ." Office Action p. 3).

Applicants submit that the Office Action fails to make a prima facie case because it never addresses the elements as arranged in the claim. Specifically, the claim requires a slurry that includes a rare earth vanadate. Reddy teaches preparing the catalyst by mixing the powdered support with ammonium metavanadate in aqueous oxalic acid. (see p. 10965, col. 1, ¶ 4). Thus, Reddy teaches using an ammonium vanadate as the starting reagent, which is the same starting reagent taught in Kleemann. Neither Kleeman nor Reddy teach or suggest using a rare earth vanadate to form a slurry that is then dried and calcined to form the catalyst composition.

The combination alleged in the Office Action appears to require using the rare earth vanadium of the finished catalyst taught in Reddy as a substitute for the ammonium vanadate in Kleeman. (see Office Action p. 3). Applicants submit that this combination is clear error

because the rare earth vanadium taught in Reddy is a finished catalyst, which includes support material and co-catalyst metals that are calcined. One of skill in the art would not use the finished catalyst of Reddy as a substitute for the vanadium starting reagent in Kleemann. Moreover, Reddy is consistent with the method in Kleemann in teaching that the vanadium should be provided as ammonium vanadate, even when the desired finished catalyst is a rare earth vanadate. Thus, one of skill in the art viewing Kleemann and/or Reddy would use an ammonium vanadate to form a slurry whether or not the desired catalyst includes a rare earth vanadate. The Office Action fails to establish a proper rationale for why one of skill in the art could or would substitute the  $\text{CeVO}_4$  taught in Reddy for the ammonium vanadate taught in Kleemann. Consequently, Applicants request that the rejection of claim 21 be withdrawn.

(ii) No Rationale For Modifying Kleemann with Reddy

The Office Action alleges that the motivation to combine Reddy with Kleemann is that "vanadia (known for its redox properties) and ceria (known for its oxygen storage and release functions) gives rise to a catalyst system that may catalyze extraneous redox reaction." Applicants submit that this motivation is incorrect because one of skill in the art would not modify a catalyst for reduction to be a catalyst for oxidation. The catalyst taught in Kleemann relates to producing a catalyst for reducing  $\text{NO}_x$ . Such a process is a reduction process that is facilitated by the consumption of ammonia. Reddy on the other hand teaches making a catalyst for oxidating volatile organics. One of skill in the art would not be motivated to modify a catalyst for reduction of  $\text{NO}_x$  to include components used for oxidation of volatile organics because oxidation is the opposite of reduction. The teachings in Reddy are not sufficient to motivate one of skill in the art to use a rare earth vanadate in combination with a support and co-catalysts used for  $\text{NO}_x$  reduction. The only motivation for this combination is found in Applicants own specification and the use of teachings from Applicants own specification constitutes impermissible hindsight. Consequently Applicants request that the rejection of claim 21 be withdrawn.

Yet another rationale for the lack of motivation to substitute  $\text{CeVO}_4$  for ammoniummetavanadate is that the catalyst produced using  $\text{CeVO}_4$  will be different than a catalyst prepared using ammoniummetavanadate due to the fact that the thermal behavior of

ammoniummetavanadate is different from that of Ce-Vanadate. If  $\text{NH}_4\text{VO}_3$  (ammoniummetavanadate) is heated in a first step  $(\text{NH}_4)_2\text{O}_3 \cdot \text{V}_2\text{O}_5$  is formed, which at  $304^\circ\text{C}$  is converted into a product of the composition  $(\text{NH}_4)_2\text{O} \cdot \text{V}_2\text{O}_4 \cdot \text{V}_2\text{O}_5$ . At  $420^\circ\text{C}$  to  $440^\circ\text{C}$  conversion into  $\text{V}_2\text{O}_5$  occurs. Ammoniummetavanadate forms vanadia ( $\text{V}_2\text{O}_5$ ) at temperatures below  $450^\circ\text{C}$ . According to Kleemann et al the catalyst is prepared by heating to  $500^\circ\text{C}$  (page 232, under 2.1) and thus  $\text{V}_2\text{O}_5$  is formed according to Kleemann which is thermally stable and which as such is present in the catalyst after heat treatment.

In contrast,  $\text{CeVO}_4$  is thermally stable and is present in the catalyst as such from the beginning. Thus, there is no analogy in the use of ammoniummetavanadate and  $\text{CeVO}_4$  because the first is thermally stable and the second is transferred into another compound during catalyst composition preparation. For this additional reason, Applicants submit that claim 1 is non-obvious in view of Kleeman and Reddy.

### **New Claims 26-30**

New claims 26-30 depend from claims 21-25, respectively and further recite that the catalyst composition is a selective reduction catalyst. Support for these claims can be found in the specification at pages 1 and 2 and in paragraph 1 of page 3. Claims 26-30 further distinguish over the combination of Kleeman and Reddy because it would not be obvious to use the teachings of Reddy related to oxidation of organics to make a selective reduction catalyst.

### **Dependent Claims 22-30**

Applicants submit that claims 22-30 are allowable for at least the same reasons that claim 21 is allowable.

### **Charge Authorization**

The Commissioner is hereby authorized to charge payment of any of the following fees that may be applicable to this communication, or credit any overpayment, to Deposit Account No. 23-3178: (1) any filing fees required under 37 CFR § 1.16; (2) any patent application and reexamination processing fees under 37 CFR § 1.17; and/or (3) any post issuance fees under 37 CFR § 1.20. In addition, if any additional extension of time is required, which has not otherwise

been requested, please consider this a petition therefor and charge any additional fees that may be required to Deposit Account No. 23-3178.

**CONCLUSION**

In view of the foregoing, Applicants submit that the pending claims are allowable. In the event that Examiner finds remaining impediment to a prompt allowance of this application that may be clarified through a telephone interview or overcome by an Examiner's Amendment, Examiner is requested to contact the undersigned attorney.

Dated this 22<sup>nd</sup> day of April, 2011.

Respectfully submitted,

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